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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/467,141 12/10/99 MA

Y M-7947-US

EXAMINER

MMC2/0620

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LEE, E

ART UNIT

PAPER NUMBER

2815

DATE MAILED:

06/20/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

09/467,141

Applicant(s)

MA ET AL.

Examiner

Eugene Lee

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 December 1999.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-36 is/are pending in the application.
- 4a) Of the above claim(s) 30-36 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-29 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 December 1999 is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

- 15) ☒ Notice of References Cited (PTO-892)
- 16) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 17) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 18) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 19) ☐ Notice of Informal Patent Application (PTO-152)
- 20) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
 - I. Claims 1 thru 29, drawn to semiconductor device, classified in class 257, subclass 314.
 - II. Claims 30 thru 36, drawn to method of making a semiconductor device, classified in class 438, subclass 1+.

The inventions are distinct, each from the other because of the following reasons:

2. Inventions I and II are related as the product made and process of making. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the product as claimed can be made by another and materially different process. For example, as an alternative to the methods set forth in claims 30-36, instead of forming the first floating gate and a second floating gate over the channel region at the same time, one could form each gate separately.
3. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.
4. During a telephone conversation with Barmak Sani on 5/31/01 a provisional election was made without traverse to prosecute the invention of device, claims 1-29. Affirmation of this election must be made by applicant in replying to this Office action. Claims 30-36 are

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withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

5. Applicant is advised that the reply to this requirement to be complete must include an election of the invention to be examined even though the requirement be traversed (37 CFR 1.143).

Drawings

6. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: element 109. See FIG. 1A. Correction is required.

7. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, claim 19 (the body region is a first well of a first conductivity type, the first well being formed in a second well of a second conductivity type opposite the first conductivity type, the second well being formed in a substrate region of the first conductivity type, wherein the first and second junctions are of the second conductivity type) must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Specification

8. The disclosure is objected to because of the following informalities: on page 2, line 12, the word "triple" is spelled incorrectly; on page 2, line 26, the word "erase" is spelled incorrectly.

Appropriate corrections are required.

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

10. Claims 1 thru 4, 7 thru 9, 25, and 26 are rejected under 35 U.S.C. 102(b) as being anticipated by Kohda et al. '999. Kohda discloses (see, for example, FIG. 3A) an EPROM cell (cell structure) comprising impurity regions (first and second junction) 2/3, channel region, first and second floating gates 4a/4b, control gate (select-gate) 6, interlayer insulation films 7a/7b, gate insulation film 8 and substrate (body region) 1. The operation of the cell is determined by the voltages applied to the source, drain, substrate and control gate. Regarding claim 26, see FIG. 7.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. Claims 5, 6, 21 thru 24, and 27 thru 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kohda et al. '999 as applied to claims 1 thru 4, 7 thru 9, 25, and 26 above, and

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further in view of Guterman '691. Kohda does not disclose the first and second floating having at least one slanted surface forming a sharp edge. However, Guterman shows (see, for example, FIG. 1) an EEPROM memory device comprising a floating gate 120, programming electrode 110 and tunneling element 101. Guterman teaches (see, for example, column 4, lines 19-42) that microtexturing the floating gate will enhance the local electric field and facilitate tunneling at lower voltages. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to have at least one slanted surface forming a sharp edge in the floating gates of Kohda so that one can enhance the tunneling of electrons from the floating gate through the insulation film to the control gate.

Regarding claims 23 and 24, the floating gates being bowl-shaped does not provide any critical or unexpected results to the cell structure's operation. Rather, it is merely an obvious design choice determinable by routine experimentation. In *Aller*, the court stated, "Where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller*, 220 F. 2d 454, 456 105 USPQ 233, 235 (CCPA 1995).

13. Claims 10 thru 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kohda et al. '999. Kohda does not expressly disclose the effects (i.e. potentials, amount of charge) associated with the various voltages applied to the source, drain, substrate and control gate as stated in claims 10-18, and 21-24. However, since the structure in Kohda is alike to the structure in the applicant's invention, the effects associated with the application of various voltages are also found in Kohda's invention. Therefore, it would have been obvious to one of ordinary skill

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in the art at the time of invention to observe the same effects (as recited in claims 10-18, 21-24) in Kohda's invention since the structures are alike and, hence, produce the same effects.

14. Claim 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kohda et al. '999 as applied to claims 1 thru 4, 7 thru 9, 25, and 26 above, and further in view of Ema et al. '907. Ema discloses (see, for example, FIG. 1) a triple-well structure comprising a substrate, n-well 20b, p-well 22b, and source/drain diffused layers 44. Ema teaches (see, for example, column 5, lines 56-67) that such a structure will prevent small geometry effects (i.e. punch-through, latch-up, etc.). Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to place the cell of Kohda in a triple-well structure so that one can prevent effects such as punch-through and latch-up.

INFORMATION ON HOW TO CONTACT THE USPTO

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eugene Lee whose telephone number is 703-305-5695. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie C. Lee can be reached on 703-308-1690. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7722 for After Final communications.

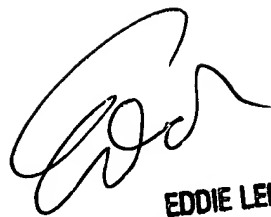
Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

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Eugene Lee
June 13, 2001

A handwritten signature in black ink, appearing to read 'Eddie Lee', is positioned above a printed title block.

EDDIE LEE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800